

# A Review of the Genus *Kobonga* Distant with the Description of a New Species (Hemiptera: Cicadidae)

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Distinguishing characters for the genus *Kobonga* (Hemiptera: Cicadidae) are listed. *Kobonga apicans* sp.n. is described from the Northern Territory and *Kobonga oxleyi* (Distant) and *Kobonga fuscomarginata* (Distant) are new combinations. A key to the six species is provided and known distributions for all species are extended and recorded in detail.

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KEYWORDS: *Cicada*, Cicadidae, *Kobonga*.

## INTRODUCTION

Distant (1906a) erected the genus *Kobonga* to accommodate *Cicada umbrimargo* Walker and later in the same year *Melampsalta godingi* Distant was transferred to *Kobonga* (Distant 1906b). A third species, *K. froggatti* Distant, was described in 1913. *Kobonga clara* Distant has since been removed from *Kobonga* as a junior synonym of *Cicadetta spinosa* (Goding and Froggatt) (Moulds 1990).

Colour figures of *K. froggatti* and *K. umbrimargo* were provided by Moulds (1990) in addition to brief diagnostic descriptions and notes on the distributions and biology of these two species. However, *K. godingi* was not discussed by Moulds and nothing has been published on this species beyond its original description. In this paper we confirm the identity of *K. godingi*, recognise *Cicadetta oxleyi* and *Pauropsalta fuscomarginata* as belonging to *Kobonga* and describe a new species that is closely allied to *K. froggatti*. *Kobonga* is redefined and we re-describe the five previously named species and include the first study of male genitalic structures in *Kobonga*.

The following abbreviations are used below: AM, Australian Museum, Sydney; ANIC, Australian National Insect Collection, Canberra; BMNH, The Natural History Museum, London; JTM, collection of J.T. Moss; MV, Museum of Victoria, Melbourne; MSM, senior author's collection; SAM, South Australian Museum, Adelaide.

For each species, measurements (in mm), are given as a range and mean, and include the smallest and largest of available specimens.

Family CICADIDAE  
Subfamily Tibicininae  
Tribe Cicadettini

**Genus *Kobonga* Distant, 1906**

*Kobonga* Distant, 1906a: 387; Distant, 1906b: 163, 177; Ashton, 1912: 27; Ashton, 1914: 351; Schulze, Kükenthal and Heider, 1926-40: 1731; Kato, 1932: 187; Neave, 1939: 831; Metcalf, 1944: 155; Metcalf, 1947: 163; Kato, 1956: 70,79; Burns, 1957: 666; Metcalf, 1963: 271; Dugdale, 1972: 877, 878, 880; Duffels and van der Laan, 1985: 299; Moulds, 1990: 129.

**Type species**

*Cicada umbrimargo* Walker, 1858, by original designation.

**Included species**

*apicans* sp.n., *froggatti* Distant, 1913; *fuscomarginata* (Distant, 1914), **comb.nov.**; *godingi* (Distant, 1905); *oxleyi* (Distant, 1882), **comb.nov.**; *umbrimargo* (Walker, 1858).

**Distribution**

Southern third of Western Australia, the central region of Northern Territory, much of South Australia except the north-east quarter, western Victoria, western NSW and eastern half of Queensland south of Townsville.

**Diagnosis**

A full diagnosis will be provided as part of a generic review of Australian cicadas by the senior author (in prep.).

**Distinguishing characters**

The fore wing ambient vein is continuously infuscated along apical cells 3-6 and often beyond, in addition to infuscations at the bases of apical cells 2 and 3, at the extremities of the longitudinal veins and in some species also elsewhere. The fore wing apical cells are much shorter than the ulnar cells in all species except *K. froggatti*. Tymbals possess five ribs, the first three long and dominant, the shorter fourth rib often broken and the fifth very short.

The male genitalia have uncal lateral lobes that are flat with an out-turned rim along upper margin to apex, this rim in ventral view distinctly stepped inwards apically. The pygofer basal lobes in *K. umbrimargo*, *K. froggatti* and *K. apicans* possess a characteristic, broad, rounded, lateral swelling, low in profile and development mostly on inner surface. The aedeagus is trifid with a fleshy endotheca and a well developed basal hinge.

**Key to Species of  
*Kobonga***

1. Hind wing with an infuscated border following ambient vein ..... 2
- Hind wing border without infuscation ..... 3
2. Head at back of eyes yellowish or light brown; dorsal area immediately anterior of pronotal collar bearing a pair of dull yellow fascia that meet, or nearly meet, on midline ..... ***apicans* sp.n.**
- Head at back of eyes black; dorsal area immediately anterior of pronotal collar entirely jet black ..... ***froggatti* Distant**

3. Length of fore wing greater than 29mm; distal end of fore wing radial cell not beyond mid length of wing ..... *umbrimargo* (Walker)
- Length of fore wing less than 27mm; distal end of fore wing radial cell beyond mid length of wing ..... 4
4. Fore wing crossvein m not infuscated; five apical cells in hind wing ..... *fuscomarginata* (Distant)
- Fore wing crossvein m partly or entirely infuscated; six apical cells in hind wing ..... 5
5. Infuscation on fore wing along margin broad, usually (but not always) of near even width, its width always consuming infuscation around apical cell 7 ..... *oxleyi* (Distant)
- Infuscation on fore wing along margin scalloped, never of near even width, the infuscation on apical cell 7 extending inwards far beyond remainder of infuscation along wing margin ..... *godingi* (Distant)

### *Kobonga umbrimargo* (Walker)

(Figs 1, 2, 11)

*Cicada umbrimargo* Walker, 1858: 32; Distant, 1905: 270.

*Melampsalta umbrimargo* (Walker): Stål, 1862: 484; Distant, 1892: 67; Goding and Froggatt, 1904: 632.

*Kobonga umbrimargo* (Walker): Distant, 1906a: 388; Distant, 1906b: 177; Kirkaldy, 1907: 309; Ashton, 1914: 351; Kato, 1932: 187; Burns, 1957: 666-667; Metcalf, 1963: 272-273; Duffels and van der Laan, 1985: 300; Ewart, 1989a: 80; Moulds, 1990: 129-130, pl. 21, figs 7a, 7b.

*Kobonga umbrimargo* (Walker) [sic]: Ashton, 1912: 27. Misspelling.

### Type

Syntype female labelled as follows: (1) Swan/R and [18]53/50 on reverse (handwritten india ink on circular label); (2) Type (circular, machine printed BMNH label with green 'Walker' border); (3) *Melampsalta* (handwritten india ink in unknown hand); (4) *C. umbrimargo*/Walker (underlined and handwritten india ink on thicker than usual card in unknown hand); (5) BMNH (E)/# 651009 (BMNH specimen database number). Examined, in BMNH.

Walker (1858) described only the female but did not designate a type nor state the number of specimens he had. The single specimen known to have been a Walker type is thus regarded as a syntype.

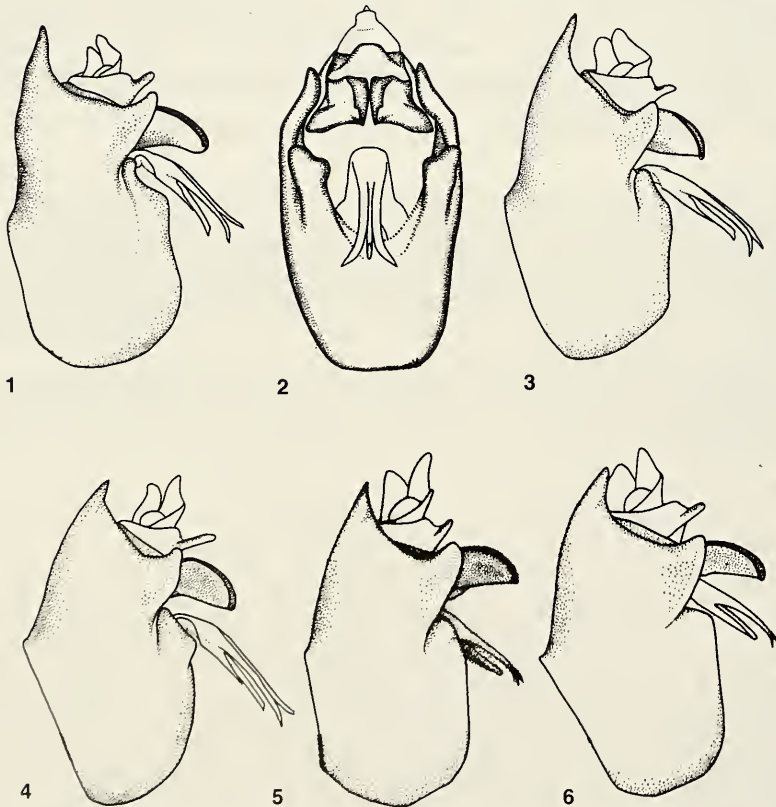
### Material examined

WESTERN AUSTRALIA: 1 male, Arthur River, 6 mi. E Darkan, 28.i.1971, G.A. Holloway and H. Hughes; 1 female, Walyunga National Park, 35 mi. NW Perth, 7.i.1971, G.A. Holloway and H. Hughes; 1 female, King George's Sound (no other data); 1 female, Perth, G.H. Hardy, No 933, K43348. (AM). 2 males, 1 female, Geraldton, 1914, Clark; 1 female, Perth, 15.xii.[19]05, Lowe, ex W.W. Froggatt Collection; 1 male, 1 female, Perth, 1917, Clark, ex W.W. Froggatt Collection; 1 male, 2 females, Cape Riche, 1.9.i.1940, K.R. Norris (ANIC). 6 males (1 genitalia prep. KO4), 3 females, Kalbarrie, 21.xi.1978, M.S. and B.J. Moulds; 1 female, Northampton, 25.i.1974, D. and N. McFarland; 1 male, Howatharra Nature Reserve, Moresby Rg, 30km NNE of Geraldton, 28:33S 114:40E, 7.xii.1973, N. McFarland; 5 males, 1 female, 8km E of Dongara, 24.xi.1978, M.S. and B.J. Moulds; 1 male, Perth, 3.i.1961, M.S. Moulds; 3 males, 1 female, Mandurah, i.1991, M.S. and B.J. Moulds; 1 female, Pinjarra, i.1990, A. Johnson;



1 male, Corrigin, 3.xii.1985, M.S. and B.J. Moulds; 3 males, Narrogin, 4.xii.1985, M.S. and B.J. Moulds; 2 males, 1 female, Oldfield River at road crossing, E of Ravensthorpe, 4.xii.1978, M.S. and B.J. Moulds; 2 males, Jerramungup, 21.x.1977, 6.xi.1983, K. and E. Carnaby; 1 male (genitalia prep. KO3), Tone Bridge [Tone River], 23.i.1975, K. and E. Carnaby; 1 male, Pallinup River x-ing, 30km W of Gnowangerup, 9.xii.1985, M.S. and B.J. Moulds; 1 female, Lancelin, 7.i.1979, K. and E. Carnaby; 1 male, South Tammin, 7.i.1979, T.M.S. Hanlon; 1 male, Yellowdine, 28.i.1979, T.M.S. Hanlon; 1 male, Mount Ragged, 17.xii.1995, M.S. and B.J. Moulds and K.A. Kopestonsky; 2 females, near Queen Victoria Rock, 31:17S 120:56E, 23.xii.1995, M.S. and B.J. Moulds and K.A. Kopestonsky; 4 males, 1 female, Lake Douglas, 12km SW of Kalgoorlie, 13.i.1989, 20.i.1991, M.S. and B.J. Moulds; 1 male, Zanthus, Trans Aust. Railway, 22.i.1991, M.S. and B.J. Moulds; 1 female, 55km ESE of Kimba, on Kimba/Iron Knob road, 12.xii.1995, M.S. and B.J. Moulds and K.A. Kopestonsky (MSM). 1 male, Cue, H.W. Brown; 1 female, Geraldton, xi.1920, J.W. Mellor [Mellor coll. via Capt. S.A. White coll.]; 1 female, Kuminim, E.F. du Boulay (SAM). 1 female, West Midland, 27.xii.[19]49, I.M. [coll. A.N. Burns]; 1 male, Camboon Park, 22.i.[19]51, I.M. [coll. A.N. Burns]; 1 female, Toodyay, xii.[19]51, R. McMillan; 1 female, Kenwick, 28.i.1960, McTurton [coll. A.N. Burns]; 1 male, Glen Forrest, 15.i.[19]50, I.M. [coll. A.N. Burns] (VM). SOUTH AUSTRALIA: 1 male, Wilpena

Figures 1-6. *Kobonga* spp., male genitalia, lateral view: (1) *umbrimargo*, Kalbarrie, WA, lateral view; (2) same, ventral view; (3) *apicans*, Witchety Bore, NT, lateral view; (4) *froggatii*, Agnew, WA, lateral view; (5) *godingi*, Inglewood, Vic, lateral view; (6) *oxleyi*, Barcaldine, Qld, lateral view.



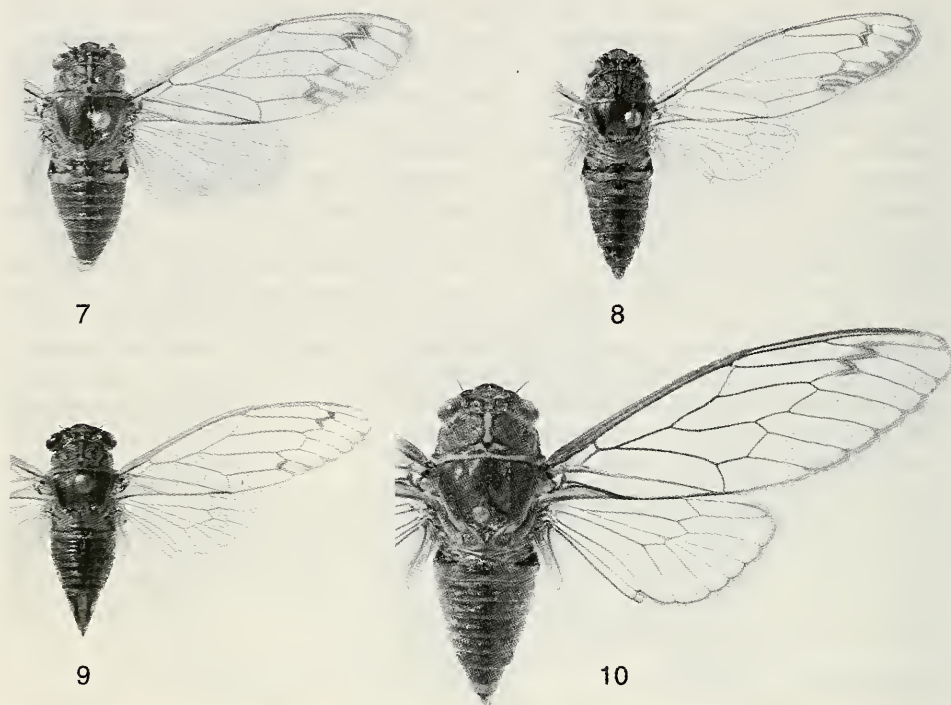
Pound, Flinders Ranges., 19.i.1976, M.S. and B.J. Moulds; 1 male, Alligator Gorge Nat. Pk. near Wilmington, 17.i.1976, M.S. and B.J. Moulds (MSM). 4 females, Musgrave Rg., 25 mile Bore, 9,12.ii.1966, P. Aitken and N.B. Tindale; 1 female, Orroroo, 9.i.[18]91, Bimbrick; 2 males, 1 female, Calpalanna W.H. Cons Pk. Wedina Well, Eyre Pen. 30.xi.1986, J.A. Forrest; 1 female, Eyria [sic] Pen., v.1897, E.M. Thring [ex Capt. S.A. White coll.]; 1 female, Ooldea, 1897, R.T. Maurice, [Wimecke coll.]; 1 female, Willowie East, xii.1984, A. McIntyre, Mt Burr Ecological Survey Group (SAM). 1 male, Orroroo, 1.i.[19]42, J.T. Gray [coll. A.N. Burns] (VM). VICTORIA: 1 male (genitalia prep. KO2), 1 female, Little Desert, near Kiata, 11.i.1976, M.S. and B.J. Moulds (MSM). 1 male, Nyah, 10.xi.[19]09, McLeach; 1 male, Kiata, 20.xii.[19]46, C. McCubbin (VM). NEW SOUTH WALES: 2 females, Round Hill, near Euabalong, i.1970, Jim Rich (AM). 1 female, 3km S of Matakana, 12.xii.1982, T.M.S. Hanlon (MSM). QUEENSLAND: 1 female, Clermont, Dr. K.K. Spence (AM). 1 female, 24km N of Miles, 21.i.1991, A. Sundholm; 1 male, 2 females, nr Alpha, 23:37:32S, 146:38:21E, 30.xii.2000, M.S. and B.J. Moulds (MSM). Rg., 25 mile Bore, 9,12.ii.1966, P. Aitken and N.B. Tindale; 1 female, Orroroo, 9.i.[18]91, Bimbrick; 2 males, 1 female, Calpalanna W.H. Cons Pk. Wedina Well, Eyre Pen. 30.xi.1986, J.A. Forrest; 1 female, Eyria [sic] Pen., v.1897, E.M. Thring [ex Capt. S.A. White coll.]; 1 female, Ooldea, 1897, R.T. Maurice, [Wimecke coll.]; 1 female, Willowie East, xii.1984, A. McIntyre, Mt Burr Ecological Survey Group (SAM). 1 male, Orroroo, 1.i.[19]42, J.T. Gray [coll. A.N. Burns] (VM). VICTORIA: 1 male (genitalia prep. KO2), 1 female, Little Desert, near Kiata, 11.i.1976, M.S. and B.J. Moulds (MSM). 1 male, Nyah, 10.xi.[19]09, McLeach; 1 male, Kiata, 20.xii.[19]46, C. McCubbin (VM). NEW SOUTH WALES: 2 females, Round Hill, near Euabalong, i.1970, Jim Rich (AM). 1 female, 3km S of Matakana, 12.xii.1982, T.M.S. Hanlon (MSM). QUEENSLAND: 1 female, Clermont, Dr. K.K. Spence (AM). 1 female, 24km N of Miles, 21.i.1991, A. Sundholm; 1 male, 2 females, nr Alpha, 23:37:32S, 146:38:21E, 30.xii.2000, M.S. and B.J. Moulds (MSM).

## Redescription

MALE (figured by Moulds 1990, Pl.21, fig.7)

*Head*.- Black and orange brown; orange brown along all or much of dorsal midline, expanded at posterior end; an orange brown blotch adjacent to each eye never reaching anterior of head; orange brown at back of eyes to varying extent; orange brown along most anterior margin of antennal plate; below orange brown in part adjacent to eyes and anteriorly on lorum which, on some individuals dominates the black. Postclypeus black and orange brown, the orange brown forming a border ventrally but sometimes with black extending into the orange brown along transverse ridges; also dominantly orange brown dorsally and at most anterior point. Anteclypeus black and orange brown to variable degree, usually black with median or paramedian orange brown fascia on about basal three quarters. Rostrum orange brown tending black apically, reaching apices of mid coxae. Antennae with basal segment orange brown, otherwise usually black or nearly so. *Thorax*.- Pronotum orange brown with black markings; black fascia either side of dorsal midline, greatly expanded laterally at anterior end and to a far lesser degree at posterior end a little before pronotal collar; usually black irregular border to lateral plates, and sometimes broken irregular black markings in or near sutures; pronotal collar orange brown, dorsally usually with black anterior border to near lateral angles and usually a black external border anterior of lateral angles. Mesonotum black and orange brown or pinkish brown, the black often dominant and forming the following markings: a dorsal pair of obconical fascia based on anterior margin and meeting on midline, a paramedian pair of obconical fascia much longer than dorsal pair and reaching to or nearly to anterior arms of cruciform elevation, a marking occupying area between anterior arms of cruciform elevation that tapers forward usually to a sharp point on midline and sometimes reaches between the pair of dorsal obconical markings and fuses with them; cruciform elevation orange brown.

Figures 7-10. *Kobonga* species, adults, dorsal view: (7) *K. godingi*, male; (8) *K. oxleyi*, male; (9) *K. fuscomarginata*, female; (10) *K. apicans*, male.



**Wings.**- Hyaline. Fore wing with distal end of radial cell not reaching beyond mid length of wing; bold infuscation overlaying basal veins of apical cells 2 and 3, variable in extent but always prominent; bold infuscation along ambient vein from apex to vein  $CuA_1$ , this infuscation extending part way along each adjoining vein but following entire perimeter of cell 7; rarely infuscated at base of apical cell 5; usually tinted brown, often weakly, at distal ends of apical cells between vein infuscations; basal cell weakly tinted amber; basal membrane usually crimson, sometimes tending pale orange; costa orange brown to reddish brown. Hind wing often without infuscation but sometimes lightly infuscated along vein 3A with some marginal diffusion at distal end; plaga crimson or sometimes tending pale orange or yellowish.

**Legs.**- Light to dark brown, considerably variable between individuals, often with areas of black and usually with a blurred pair of black fascia along much of length of mid and hind femora.

**Opercula.**- Muddy pale yellow, sometimes a little black at base; outer margin fringed with long silver cilia. Meracantha broad, near an equilateral triangle, muddy yellow with black at base.

**Abdomen.**- Tergites orange brown to pinkish brown with a broad black anterior margin to each segment variable in extent between individuals, sometimes reaching to lateral extremity and always covering at least half of tergite 8; tergites 2-7 with a black irregular patch of variable extent near lateral extremities close to posterior margin, this patch on some individuals merged with the black following anterior margin; ventral surface of tergites 3-7 yellowish brown to reddish brown with narrow muddy yellow posterior margin. Sternites I and II often substantially black with muddy yellow



or brown posterior margin; sternites III-VII muddy yellow to yellowish brown each with a black anterior blotch on midline tending reddish at margins, these forming a broad, broken central fascia; sternite VIII muddy yellow to yellow brown, sometimes with black basally.

**Genitalia** (Figs 1, 2) Pygofer upper lobe in lateral view broad basally, tapering to rounded apex, variable in size and proportions between individuals; basal lobe with apex rounded and a lateral, low, rounded swelling developed to varying degrees, also variable between individuals. Uncal lateral lobes with edging rim terminating a little above level of ventral margin of lobe. Aedeagus with endotheca long, from its visible base extending three quarters or more to apex of pseudoparameres.

**FEMALE** (figured by Moulds 1990, Pl.21, fig.7a)

Similar to male. Abdominal segment 9 in dorsal view a little longer than an equilateral triangle; black and orange brown; a pair of paramedian black fascia that sometimes continue to dorsal spine; suffused black laterally on basal half to varying degrees; apical spine at least black at apex, sometimes entirely black; a black spot mid laterally on distal half. Ovipositor sheath terminating near level with apical spine.

Figures 11-12. Distribution of *Kobonga* species: (11) *umbrimargo* and *fuscomarginata*; (12) *froggatti*, *apicans*, *oxleyi* and *godingi*.



**MEASUREMENTS**

n = 10 males, 10 females (includes largest and smallest of available specimens). Length of body: male 23.1 - 26.5 (24.9); female 25.7 - 29.1 (27.3). Length of fore wing: male 29.3 - 34.8 (32.2); female 33.8 - 38.6 (36.0). Width of head: male 7.1 - 8.3 (7.8); female 8.0 - 9.3 (8.5). Width of pronotum: male 7.9 - 9.0 (8.7); female 8.4 - 10.3 (9.4).

**Distinguishing characters**

Most similar to *K. godingi* from which specimens can be separated by having the distal end of the fore wing radial cell not reaching to mid length of wing; that of *godingi* extends clearly beyond mid length. In addition *umbrimargo* is a larger insect with a fore wing length greater than 29 mm; that of *godingi* never reaches 29mm.

**Distribution** (Fig. 11)

Throughout much of the southern half of mainland Australia, primarily inland in areas receiving less than 750 mm annual rainfall. It appears to be most common in Western Australia where specimens have been taken in many localities south of the Murchison River and east to Zanthus. It is widespread in South Australia except for the north-eastern quarter but is the most common to the east and west of Spencer Gulf. Records from the eastern States are sparse; there are records only from north-western Victoria, near Euabalong in central New South Wales and from Clermont, Alpha and Miles in Queensland. Adults have been taken from late October to early March.

Specimens recorded as this species by Goding and Froggatt (1904) from Ardrossan and Gawler are *K. godingi* (see comments under that species).

**Habitat**

Myrtaceous trees, especially *Eucalyptus* spp. where adults mostly frequent the upper trunk and branches.

**Song**

Unknown.

***Kobonga godingi* (Distant)**

(Figs 3, 7, 12)

*Melampsalta godingi* Distant, 1905: 270.

*Kobonga godingi* (Distant): Distant, 1906b: 177; Burns, 1957: 666; Metcalf, 1963: 272; Duffels and van der Laan, 1985: 300; Moulds, 1990: 129.

*Melampsalta umbrimargo* (Walker): Goding and Froggatt, 1904: 632, pl. xviii, fig. 12 (partim, misident., localities Ardrossan and Gawler only).

**Note on synonymy**

Goding and Froggatt (1904) quoted a slightly edited version of Walker's original description of *umbrimargo* but added two further locality records, Ardrossan and Gawler. However, their figure of a fore wing (Pl.18, fig.12) suggests they may have misidentified the specimens representing these additional localities. Distant (1905) described Goding and Froggatt's Ardrossan and Gawler specimens as a new species, *godingi*, and not as a new name for *umbrimargo* Goding and Froggatt as erroneously stated by Metcalf (1963); there is in fact no nominal species *umbrimargo* Goding and Froggatt as distinct from *umbrimargo* Walker.

**Type**

Male syntype labelled as follows: (1) *Melampsalta/ Godingi/Dist/type* (handwritten india ink possibly in Distant's hand); (2) Type (circular, machine printed



label with red border); (3) Distant Coll./1911-383 (machine printed); (4) No 4. (handwritten, india ink); (5) *Melampsalta/umbrimargo/Walk/Queensland* (handwritten, india ink, in an unknown hand but appearing not to be that of Distant, Froggatt or Masters). Examined, in BMNH.

Distant (1905) apparently based his description on at least two males as he describes only the male and gives Androssan and Gawler as localities. Only the male above could be identified as belonging to the type series. The fifth label detailed above gives the locality as Queensland but Androssan and Gawler are both in South Australia. However, there is no reason to doubt the association of the first four labels with this specimen as it clearly fits Distant's description; the fifth label stating Queensland is considered erroneously attached. Further, this species is unknown from Queensland.

### Material examined

Type as above and the following: NEW SOUTH WALES: 1 female, W. Wyalong, 23.xi.1963, J.C. Le Souef (MSM). VICTORIA: 1 male, 5km SW of Inglewood, 29.xii.1989, K.L. Dunn (MSM). SOUTH AUSTRALIA: 1 female, no locality apart from State, 1904, Mac. Dup., ex W.W. Froggatt Collection (ANIC). 7 males, 5 females, S. Australia (or S. Aust.) (1 male labelled *umbrimargo*, sic) (MM). STATE UNKNOWN: 1 male, ex W.W. Froggatt Collection (ANIC).

### Redescription

Similar to *K. umbrimargo* but differing as follows.

#### MALE (Fig. 7)

*Head*.—Usually black at back of eyes rather than orange brown.

*Thorax*.—Prothorax normally with extensive irregular black blotches following sutures of lateral plates.

*Wings*.—Fore wing with distal end of radial cell beyond mid length of wing; always with an infuscation at proximal end of apical cell 5; never weakly tinted brown at distal end of apical cells between vein infuscations.

*Abdomen*.—Tergites usually dominantly black rather than usually half black and half orange brown.

*Genitalia* (Fig. 3).—Similar to *K. umbrimargo* but with pygofer basal lobes lacking an obvious, low, rounded, lateral swelling; uncal lateral lobes with edging rim terminating at level of ventral margin of lobe; ventral support of aedeagus much longer, its length almost equal to that of endotheca.

#### FEMALE

Similar to male. Abdominal segment 9 recurved below apical spine, sometimes to such an extent as to project distally to level of spine apex.

### MEASUREMENTS

n = 8 males, 7 females (includes all of available specimens). Length of body: male 18.1-20.6 (19.05); female 16.6-20.0 (18.53). Length of fore wing: male 21.4-24.6 (23.05); female 21.5-26.0 (23.60). Width of head: male 5.6-6.3 (5.89); female 5.5-6.3 (5.87). Width of pronotum: male 6.1-7.2 (6.56); female 6.0-7.2 (6.51).

### Distinguishing characters

Most similar to *K. umbrimargo* from which it is best distinguished by the characters listed under that species.

**Distribution** (Fig. 12)

Known only from West Wyalong in southern inland New South Wales, Inglewood in western Victoria and from South Australia in the vicinity of Vincent Gulf at Gawler and Androssan. Specimens have been taken in November and December.

**Habitat**

Unknown.

**Song**

Unknown.

***Kobonga oxleyi* (Distant), comb.n.**

(Figs 4, 8, 12)

*Melampsalta oxleyi* Distant, 1882: 131; Goding and Froggatt, 1904: 655; Distant, 1906b: 174; Ashton, 1912: 26; Burns, 1957: 660.

*Cicadetta oxleyi* (Distant): Weidner and Wagner, 1968: 149; Duffels and van der Laan, 1985: 290; Ewart, 1988: 182, pl.2, fig.D; Lithgow, 1988, 65; Ewart, 1989a: 80; Moulds, 1990: 147, pl.21, fig.1; Ewart, 1998: 60.

**Type**

Holotype female labelled as follows: (1) Peak-Downs./Mus. Godeffroy./No. 17618 (partly machine printed, partly handwritten); (2) M./oxleyi/Dist. (handwritten with lined border); (3) Z.M.H./Hamburg (machine printed with lined border); (4) No. 17618./Melampsalta/oxleyi/Dist./ P Downs (handwritten on a machine-printed label with a heavy black outer border and light inner border and stating Museum Godeffroy Hamburg); (5) Type (machine printed on red label). Examined, in Universität Hamburg, Zoologisches Institut und Zoologisches Museum.

**Material examined**

Type as above and the following: QUEENSLAND: 1 male, 'Glendon', W of Mackay, 20-29.ii.[19]84, J.T. Moss; 1 male, Cunnamulla, J.T. Moss (JTM). 3 males, Reid River, 50km S of Townsville, 6.ix.1992, M.F. Braby; 1 male, 1 female, six miles N of Main Range Ck, approx 56m S of Sarina, brigalow scrub, Bruce Highway, 10.xi.1973, A. and M. Walford-Huggins; 1 male, 2 females, Clermont, iv.1988, S. Lamond; 5 males, 2 females, Barcaldine, 10.ii.1981, M.S. and B.J. Moulds; 2 males, 1 female, 5km N of Mourangee Hsd, nr Edungalba, 8.xii.1984, 2.i.1988, E.E. Adams; 1 female, 3.5km N of Mourangee Hsd, nr Edungalba, 24.xii.1988, E.E. Adams; 1 male, 3km E of Mourangee Hsd, nr Edungalba, 3.i.1988, G. van Moelenbroek; 1 male, Edungalba, nr Daringa, 22.i.1982, M.S. and B.J. Moulds; 2 males, 1 female, base, Mount Scoria, 6km S Thangool, 24:32S 150:36E, 11.ii.1991, G. and A. Daniels, C. Burwell; 1 male, 56km S of Rolleston, 20.xii.1983, M.S. and B.J. Moulds; 1 female, 6km N of Taroom, 25:36S 149:46E, 1.x.1991, 200m, mv lamp, G. Daniels; 4 males, 35km SSE of Roma, 23.xi.1986, M.S. and B.J. Moulds; 1 female, Lake Broadwater Nat Park, Dalby, 25.x.1986, R. Eastwood (MSM). NEW SOUTH WALES: 1 male, 'Woodbine' 17km W of Goolgowi, 11.xii.1992, M. Coombs (MSM).

**Redescription**

Similar to *K. umbrimargo* but differing as follows.

**MALE** (Fig. 8; figured by Moulds 1990, Pl.21, fig.1)

*Head*.- Orange brown areas tending green on live specimens; head below with minimal black.

*Thorax*.- Nearly always lacking the anteriorly-projecting black marking based between anterior arms of cruciform elevation but always possessing a small black spot near distal end of each anterior arm of cruciform elevation.

*Wings*.- Fore wing with distal end of radial cell clearly beyond mid length of wing; marginal infuscation usually band-like and usually of an even dark intensity; often infuscated at base of apical cell 5; basal cell hyaline; costa green in life, tending yellowish brown on dried specimens. Hind wing plaga white or whitish.

*Abdomen*.- Tergites with black dominating.

*Genitalia* (Fig. 4).- Similar to *K. godingi* but basal lobe of pygofer broader in lateral view.

## **FEMALE**

Similar to male. Abdominal segment 9 substantially orange brown, black markings confined to a small mid lateral spot on distal half and a narrow basal band that joins a pair of paramedian fascia that never reach the apical spine.

## **MEASUREMENTS**

n = 10 males, 10 females (includes largest and smallest of available specimens). Length of body: male 16.7-20.1 (18.65); female 18.0-20.3 (19.43). Length of fore wing: male 20.3-24.9 (22.78); female 23.2-25.4 (24.22). Width of head: male 5.2-7.0 (5.8); female 5.4-6.4 (6.01). Width of pronotum: male 5.3-7.5 (5.96); female 5.5-6.9 (6.24).

## **Distinguishing characters**

Most similar to *K. fuscomarginata* from which it differs in the much broader infuscation on the fore wing margin which always incorporates to some degree cross vein m; there are also 6 marginal cells to the hind wing instead of 5. It is possible that *K. oxleyi* and *K. fuscomarginata* are one and the same species (see comments under *K. fuscomarginata*).

## **Distribution** (Fig. 12)

The eastern half of Queensland south from near Townsville in areas receiving less than 800 mm annual rainfall, and from inland southern New South Wales near Goolgowi. Adults occur from September (Ewart 1998) to April.

## **Habitat**

Open forest, including brigalow and casuarina woodlands, where adults inhabit foliage (Ewart 1988, 1998).

## **Song**

Ewart (1988, 1998) provide oscillograms of the calling song. He describes the call as particularly distinctive, consisting of alternating 'chirping' and 'clanging' phrases peaking at 7-10 kHz.

## ***Kobonga fuscomarginata* (Distant), comb.n. (Figs 9, 11)**

*Pauropsalta fuscomarginatus* Distant, 1914: 63-64; Ewart, 1989b: 293.

*Melampsalta fuscomarginata* (Distant): Burns, 1957 653.

*Pauropsalta fuscomarginata* (Distant): ?Dugdale, 1972: 877 (uncertain identification); Duffels and van der Laan, 1985: 301; Moulds, 1990: 131.



## Types

Syntype male and female labelled as follows: (1) Yarrawin/N.S.W/20.11.13/W.W.F. (handwritten india ink); (2) 1914.122 (handwritten india ink referring to BMNH register entry); (3) 84 (handwritten india ink); (4) Pauropsalta/fuscomarginata/type Dist. (handwritten india ink possibly in Distant's hand); (5) (syntype male only) Type/H.T (circular, machine printed BMNH label with red border). The male is also labelled BMNH (E)/# 651019 (BMNH specimen database number) and the female BMNH (E)/# 651020. Examined, in BMNH.

Distant (1914) based his description on at least two specimens as he gives the BMNH and AM as depositories. The latter could not be found and is presumed destroyed. It is interesting that the female is labelled as a type, apparently in Distant's hand, as the original description gives male measurements only and there is no specific mention of a female.

## Material examined

Type as above and the following: QUEENSLAND: 1 male, Cunnamulla, x.1941, N. Geary (AM). NEW SOUTH WALES: 1 female, 30km S of Lightning Ridge, 27.xii.1988, M.S. and B.J. Moulds (MSM). VICTORIA: 1 female, Grampians, 1905, Hill, ex W.W. Froggatt Collection (ANIC).

## Redescription

Similar to *K. oxleyi* but differing as follows.

### MALE

*Wings*.— Fore wing marginal infuscation narrow, never incorporating crossvein m. Hind wing with 5 apical cells.

### FEMALE (Fig. 9)

Similar to male. Abdominal segment 9 similar to that of *K. oxleyi*.

## MEASUREMENTS

n = 1 male, 2 females (includes all of available specimens). Length of body: male 16.8; female 17.1-17.4 (17.25). Length of fore wing: male 20.2; female 21.3-22.0 (21.65). Width of head: male 5.3; female 5.6-5.9 (5.75). Width of pronotum: male 5.3; female 5.9-6.0 (5.95).

## Distinguishing characters

Very similar to *K. oxleyi* but the extent of the fore wing infuscation is far less. The five apical cells to the hind wing of *fuscomarginata* appear to distinguish it from *K. godingi* which has six apical cells. It is possible that specimens of *fuscomarginata* are aberrant individuals of *oxleyi* but a lack of material makes a conclusive decision difficult. Specimens of *K. umbrimargo* show considerable differences in the extent of the fore wing marginal infuscation, the extremes almost equalling the difference shown between *fuscomarginata* and *oxleyi*. Reduction in the number of hind wing cells is also not uncommon in the Cicadettini, also suggesting the possibility that the 5 hind wing cells of the four known specimens of *fuscomarginata* may be aberrations.

## Distribution (Fig. 11)

Known only from Cunnamulla in far south-western Queensland, near Lightning Ridge and Yarrawin (type locality) in western New South Wales and from the Grampians in the central west of Victoria.

Distant (1914) gives the type locality as '504 miles west from Sydney but the male syntype is labelled 'Yarrawin'. There is a pastoral property by this name some 50

km SE of Brewarrina and this is presumably the type locality. There are records for October and December only.

### Habitat

Unknown.

### Song

Unknown.

### *Kobonga froggatti* Distant

(Figs 5, 12)

*Kobonga froggatti* Distant, 1913: 490; Ashton, 1915: 91; Distant, 1915: 53; Burns, 1957: 666; Metcalf, 1963: 272; Duffels and van der Laan, 1985: 300; Moulds, 1990: 129, pl. 21, fig.5.

*Kobonga castanea* Ashton, 1914: 351, pl.7, figs 5,5a; Ashton, 1915: 91; Distant, 1915: 53.

### Types

*Kobonga froggatti*. Female syntype labelled as follows: (1) Australia/W.W. Froggatt/1913-364 (machine printed); (2) Cue, W.A./H.W. Brown (machine printed); (3) 71.W.W.F./1913 (handwritten india ink); (4) Kobonga/froggatti/type Dist. (handwritten india ink possibly in Distant's hand); (5) Type (circular, machine printed BMNH label with red border); (6) BMNH (E)/# 651011 (BMNH specimen database number). Examined, in BMNH.

Distant (1913) did not state the number of females upon which he based his description. Only the specimen above has been identified as belonging to the type series.

*Kobonga castanea*. Male syntype, labelled (1)'Cue, W.A./H.W. Brown (machine printed); (2) Ashton coll./K. castanea co-type'. Examined, in AM.

Ashton (1914) did not state the number of males upon which he based his description. Only the specimen above has been identified as belonging to the type series. A female labelled 'Type' in SAM is not considered to be part of the syntype series as the description appears to be based on males only.

### Material examined

WESTERN AUSTRALIA: 1 male, 1 female, Cue, H. Brown, No. 71, ex W.W. Froggatt Collection (ANIC). 2 males, 60km W of Sandstone, 18.i.1989, M.S. and B.J. Moulds; 5 males, 1 female, 25km E of Sandstone, 17.i.1989, M.S. and B.J. Moulds; 28 males (3 genitalia preps KO1, KO10, KO11), 24 females, 17.i.1989, Agnew, 27:59S 120:41E, M.S. and B.J. Moulds; 1 male, 65km SE of Leinster, 28:20S 121:05E, 16.i.1989; M.S. and B.J. Moulds; 2 males, 18km N of Leonora, 16.i.1989, M.S. and B.J. Moulds; 3 males, 2 females, Leonora, 15.i.1989, M.S. and B.J. Moulds (MSM). 3 females, Cue, H.W. Brown (one labelled as Type, see above) (SAM). SOUTH AUSTRALIA: 6 males, 7 female, Stuart Hwy, 16km N of Tarcoonyinna Ck x-ing, 5.ii.1984, M.S. and B.J. Moulds; 1 female, 65km S of Wintinna Hsd., 5.ii.1984, M.S. and B.J. Moulds; 1 male, 30km S of Mt Willoughby Stn, 6 Feb. 1984, M.S. and B.J. Moulds; 1 female, Coober Pedy, 23.xii.1988, S. Lamond (MSM).

### Redescription

**MALE** (figured by Moulds 1990, Pl.21, fig.5)

**Head.**-Black, usually a small inconspicuous yellowish brown area visible under magnification on antennal plate adjacent to postclypeus and on midline near posterior margin; postclypeus black with lateral margins broadly yellowish brown, the colour often reaching to distal end and the black extending into yellow along transverse ridges.

Anteclypeus black. Rostrum black sometimes tending brown basally. Antennae black or nearly so, sometimes brown at distal end of basal segment.

*Thorax*.— Pronotum dark reddish brown to near black; a broad jet black fascia along dorsal midline usually encompassing a narrow muddy yellow fascia for much of its length, the black gently tapering distally with both anterior and posterior ends expanded laterally but most pronounced on latter; pronotal collar dull mid yellow between lateral angles, anterior of lateral angles black or nearly so but sometimes with areas of yellowish brown. Mesonotum dark reddish brown; a dorsal pair of obconical black fascia based on anterior margin and meeting on midline; a paramedian pair of similar but larger fascia that reach to extremities of anterior areas of cruciform elevation; black between anterior arms of cruciform elevation, often with ill-defined margin; cruciform elevation black and dark brown, the anterior arms nearly always partly or entirely dark brown.

*Wings*.— Hyaline. Fore wing with distal end of radial cell not reaching beyond mid length of wing; bold infuscation overlaying basal veins of apical cells 2 and 3; bold infuscation along ambient vein from apex to vein  $CuA_2$ , the infuscation extending part way along each adjoining vein except  $CuA_2$ ; basal cell hyaline or very nearly so; basal membrane grey, usually dark. Hind wing with bold infuscation along ambient vein except on leading edge; plaga muddy white.

*Legs*.— Black and yellow; fore femur with a prominent dull yellow fascia mid laterally on outer surface and a smaller yellow fascia almost dorsal; mid and hind coxae, trochanters and femora dull yellow on their inner surfaces; hind tibia brown at distal end.

*Opercula*.— Muddy yellow, partially black at base and around inner margin; outer margin fringed with long silver cilia. Meracantha greater than equilateral triangle.

*Abdomen*.— Tergites dominantly black, tergite 2 with posterior margin dark reddish brown dorsally, tergites 3-8 with posterior margins reddish brown tending yellow at extreme edge, coloring on 8 broadest and dominantly yellow. Sternites brownish yellow with broad black midline, sternite VII with the black tapering to terminate short of distal margin, sternite VIII blackish only at base.

*Genitalia* (Fig. 5).— Similar to *K. umbrimargo* but with median lobe longer and uncatal lateral lobes with edging rim terminating at level of ventral margin of lobe.

## FEMALE

Similar to male. Abdominal segment 9 in dorsal view near an equilateral triangle; black dorsally and laterally, brown or brownish yellow ventrally and sometimes apically except for black apical spine. Ovipositor sheath projecting marginally beyond pygofer apical spine.

## MEASUREMENTS

$n = 10$  males, 10 females (includes largest and smallest of available specimens). Length of body: male 24.8 - 31.7 (29.0); female 31.0 - 36.3 (33.25). Length of fore wing: male 32.8 - 37.9 (35.7); female 36.5 - 40.6 (38.95). Width of head: male 8.3 - 9.4 (8.95); female 8.8 - 10.2 (9.6). Width of pronotum: male 9.1 - 10.6 (9.9); female 9.6 - 12.1 (10.8).

## Distinguishing features

In general appearance most similar to *K. apicans*, especially in wing markings. Best separated from *K. apicans* by the characters listed in couplet 2 of the Key to Species.

## Distribution (Fig. 12)

Western Australia between Cue and Leonora and in South Australia from near Chandler to Coober Pedy. The lack of records from localities between these two widely separated areas of distribution is almost certainly a consequence of inadequate collecting.



The localities, Moir's Rock and Merredin recorded for this species by Moulds (1990) should be referred to *K. apicans*, a species described in this paper. Adults have been taken in December, January and February, but adult emergence is strongly influenced by rainfall with most appearing immediately after heavy summer rain.

### Habitat

Mulga, *Acacia aneura*, and other shrubs.

### Song.

Unknown.

### *Kobonga apicans* sp.n.

(Figs 6, 10, 12)

### Types

*Holotype* male, 70km E of The Three Ways, nr Tennant Creek township, Northern Territory, 21.i.1984, M.S. and B.J. Moulds (AM). *Paratypes*:- WESTERN AUSTRALIA: 2 males (1 genitalia prep. KO12), Moir's Rock, 42km NNW of Salmon Gums, 32:39S 121:25E, 3.i.1987, G. and A. Daniels (MSM). 1 female, Dedari, 20.i.[19]34, H.W. Brown; 1 male, Merredin, 15.xii.[19]60, L. Willis [coll. A.N. Burns] (MV). NORTHERN TERRITORY: 2 males, 1 female, (1 male genitalia prep. KO6), 200km N of Tennant Creek township, Stuart Hwy, 4.iv.1984, K. and E. Carnaby; 1 male (genitalia prep. KO8), 8 females, same data as holotype; 1 male, 1 female, Taylors Creek, 47km N of Barrow Creek township, 22.i.1984, M.S. and B.J. Moulds; 1 female, (genitalia prep KO5), Witchetty Bore, Mt Allan Stn, 7.i.1977, G. Griffith (MSM). SOUTH AUSTRALIA: 1 male, Musgrave Ra, 25ml Bore, 10.ii.[19]66, P. Aitken and N.B. Tindale (SAM).

### Description

#### MALE (Fig. 10)

Similar to *K. froggatti* but differing as follows.

*Head*.-Eyes set back hard against pronotum (those of *froggatti* tend to protrude with a gap between); back of eyes yellowish or light brown, never black.

*Thorax*.- Yellow pronotal midline more pronounced and adjacent to the posterior end of this fascia a pair of laterally directed yellow fascia that touch on midline; pronotal collar yellow between lateral angles as for *K. froggatti* but the yellow considerably narrowed by black along anterior margin; cruciform elevation substantially muddy yellow.

*Legs*.- Similar to *K. froggatti* but distal end of mid and hind femora with distinct yellow lateral patch.

*Abdomen*.- Tergites rarely entirely black on basal half, sometimes dominantly reddish brown.

*Genitalia* (Fig. 6).-Similar to *K. umbrimargo* but uncus lateral lobes with the edging rim terminating at level of ventral margin of lobe.

#### FEMALE

Similar to male. Abdominal segment 9 long, in dorsal view much longer than wide; dominantly muddy yellow, black or near black laterally but not reaching distal margin; the lateral black area usually with a black finger projecting distally in subdorsal region; apical spine black or near black. Ovipositor sheath long, projecting at least 1mm beyond pygofer apical spine.

## MEASUREMENTS

n = 4 males, 10 females (includes largest and smallest of available specimens). Length of body: male 23.4 - 24.7 (24.0); female 29.4 - 33.2 (30.95). Length of fore wing: male 29.1 - 30.2 (29.8); female 32.8 - 36.6 (36.6). Width of head: male 7.3 - 7.4 (7.33); female 8.0 - 8.9 (8.35). Width of pronotum: male 8.1 - 8.8. (8.3); female 8.7 - 10.2 (9.5).

## Etymology

A modification of the latin *apricatio* meaning basking in the sun, and referring to the species apparent liking for the sun and a hot climate.

## Distinguishing Characters

Very similar to *K. froggatti* from which it is best separated by the characters listed in couplet 2 of the Key to Species. Females of *K. apicans* differ from all other *Kobonga* species in having abdominal segment 9 very elongate and the ovipositor sheath very long so that it extends at least 1 mm beyond the pygofer apical spine.

## Distribution (Fig. 12)

Inland Northern Territory south from the Tennant Creek district, Musgrave Ranges in the north of South Australia, and inland districts of south-western Western Australia between Coolgardie, Merredin and Salmon Gums. The absence of records across Western Australia is almost certainly an artifact of inadequate collecting. There are records for December, January, February and April but adult emergence is probably restricted to periods immediately following heavy rains.

## Habitat

Tall shrubland in which adults are probably associated with *Acacia* spp.

## Song

Unknown.

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